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REMARKS

Claims 14-21 are pending.

Claims 14-17 have been withdrawn from consideration.

Claims 18-21 stand rejected.

Claim 18 has been amended. Support for this amendment can be found throughout the specification and drawings, as originally filed.

The drawings, specifically Figs. 8 and 11, stand objected to.

Figures 8 and 11 have been amended. Support for these amendments can be found throughout the specification and drawings, as originally filed.

CHANGE OF ATTORNEY'S ADDRESS

Please note that the attorney's address in the instant application has changed to the following:

Warn, Hoffmann, Miller & LaLone, P.C.
P.O. Box 70098
Rochester Hills, Michigan 48307

INFORMATION DISCLOSURE STATEMENT

The Applicants submit herewith copies of previously cited foreign references GB 9171 and CA 627965 (previously referred to erroneously as "622965") for the Examiner's review.

DRAWING OBJECTIONS

The drawings stand objected to because in Figure 8, numeral "412" is not frustoconical, and in Fig. 11, numeral "618" references the port body and not the groove.

The Applicants respectfully traverse the objection to the drawings.

In the interests of expediting the prosecution of the instant application, and without admission that any amendment is necessary, the Applicants have amended the drawings, including Figs. 8 and 11, in accordance with the Examiner's suggestions. Specifically, the drawings, including Figs. 8 and 11, have been amended to correct reference numerals corresponding to elements disclosed in the specification. More specifically, the leader line corresponding to reference numeral 412 of Fig. 8 has been redrawn to terminate on the frustoconical portion of the plug 402; and the leader line corresponding to reference numeral 618 of Fig. 11 has been redrawn to terminate on the groove surface of the port 606.

A Request for Approval of Drawing Changes is being submitted concurrently herewith. The Applicants aver that no new matter has been added by virtue of these amendments.

35 USC §102(b) REJECTION

Claims 18-21 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 1,862,920 to Boynton.

The Applicant respectfully traverses the 35 USC §102(b) rejection of claims 18-21.

The law is clear that anticipation requires that a single prior art reference disclose each and every limitation of the claim sought to be rejected. 35 USC §102(b).

The law is also clear that a claim in dependent form shall be construed to incorporate all the limitations of the claim to which it refers. 35 USC §112 ¶ 4.

In the interests of expediting prosecution of the instant application, and without any admission that an amendment is necessary, the Applicant have amended claim 18 to recite, among other things, a fitting for a fluid conduit, the fitting comprising: (1) a unitary fitting member having a cap portion, an externally threaded portion and a seal portion, wherein the cap portion is spaced and opposed from the externally threaded portion, the seal portion including a frustro-conical surface and a seal groove, the seal groove formed into the frustro-conical surface and perpendicular thereto, the seal groove being defined by a constant radius; (2) an annular seal member disposed at least partially in the seal groove; and (3) a port for receiving the fitting member.

Boynton discloses no such structure as recited in claim 18. Specifically, Boynton does not teach a unitary fitting member, but rather a combination of two separate and discrete components, namely a fitting member (2) and a cap member (4) (see Figs. 1-3). Further, Boynton does not teach an externally threaded portion, but rather an internally threaded portion (see Figs. 1-3). Furthermore, Boynton does teach that the threaded member is spaced and opposed from the cap portion, but rather the threaded portion and the cap portion are substantially coaxial (see Figs. 1-3). Accordingly, Boynton does not

anticipate claim 18. Furthermore, claims 19-21, which depend from and further define claim 18, are likewise not anticipated by Boynton.

Accordingly, the Applicant submits that the 35 USC §102(b) rejection of claims 18-21 has been overcome.

Furthermore, Boynton does not render claims 18-21 obvious.

The standard for obviousness is that there must be some suggestion, either in the reference or in the relevant art, of how to modify what is disclosed to arrive at the claimed invention. In addition, "[s]omething in the prior art as a whole must suggest the desirability and, thus, the obviousness, of making" the modification to the art suggested by the Examiner. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051, 5 U.S.P.Q.2d (BNA) 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988). Although the Examiner may suggest the teachings of a primary reference could be modified to arrive at the claimed subject matter, the modification is not obvious unless the prior art also suggests the desirability of such modification. *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d (BNA) 1397, 1398 (Fed. Cir.1989). There must be a teaching in the prior art for the proposed combination or modification to be proper. *In re Newell*, 891 F.2d 899, 13 U.S.P.Q.2d (BNA) 1248 (Fed. Cir. 1989). If the prior art fails to provide this necessary teaching, suggestion, or incentive supporting the Examiner's suggested modification, the rejection based upon this suggested modification is error and must be reversed. *In re Bond*, 910 F.2d 831, 15 U.S.P.Q.2d (BNA) 1566 (Fed. Cir. 1990).

As previously noted, Boynton fails to suggest any such structure as recited in claim 18. Specifically, Boynton does not suggest a unitary fitting member, but

rather a combination of two separate and discrete components, namely a fitting member (2) and a cap member (4) (see Figs. 1-3). Further, Boynton does not suggest an externally threaded portion, but rather an internally threaded portion (see Figs. 1-3). Furthermore, Boynton does suggest that the threaded member is spaced and opposed from the cap portion, but rather the threaded portion and the cap portion are substantially coaxial (see Figs. 1-3). Accordingly, Boynton render claim 18 obvious. Furthermore, claims 19-21, which depend from and further define claim 18, are likewise not rendered obvious by Boynton.

CONCLUSION

In view of the foregoing, the Applicant respectfully requests reconsideration and reexamination of the Application. The Applicant respectfully submits that each item raised by Examiner in the Office Action of March 18, 2004 has been successfully traversed, overcome or rendered moot by this response. The Applicant respectfully submits that each of the claims in this Application is in condition for allowance and such allowance is earnestly solicited.

The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 364-4300 if any unresolved matters remain.

Any needed extension of time is hereby requested with the filing of this document.

The Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 501612. A duplicate copy of this letter is enclosed herewith for this purpose.

Respectfully submitted,
WARN, HOFFMANN, MILLER & LALONE, P.C.
Attorney(s) for Applicant(s)

Dated: June 18, 2004 By: _____

Douglas P. LaLone
Reg. No. 37,167
Preston H. Smirman
Reg. No. 35,365

P.O. Box 70098
Rochester Hills, MI 48307
Telephone: (248) 364-4300
Fax: (248) 364-4285

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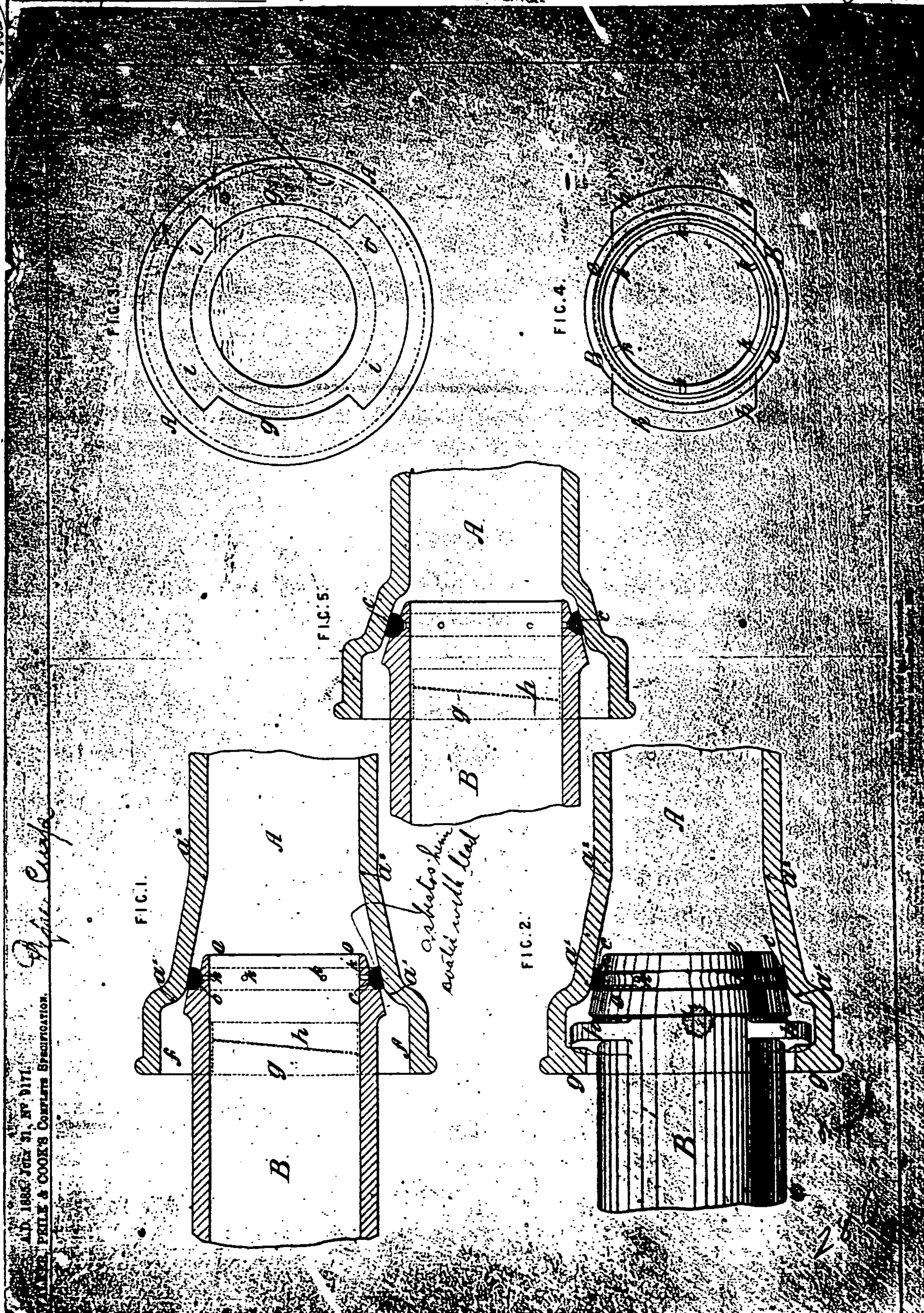

CANADA
DIV. 57

Canadian Patent Office

627,965
Issued Sept. 26, 1961

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Patent No. 627,965

Conduit Joint Structure

Henry G. Henrickson, Des Plaines, Illinois, U.S.A., assignor, by mesne assignments, to Gateway Erectors, Inc., Chicago, Illinois, U.S.A.

Application February 9, 1956, Serial No. 701,374
In the United States February 21, 1955
1 Claim

The present invention relates to sectional conduits and has for its principal object the provision of an improved conduit joint structure including a coupling member and an adjacent conduit section, both of which are provided with improved constructions which cooperate with each other to provide a highly effective fluid tight connection.

The improved structure of the present invention has been designed primarily for use as surface pipe lines for transporting gas, oil or water from sources of supply to remote places for storage, refining or distribution. Such pipe lines, as heretofore constructed, have comprised steel pipe sections of several inches in diameter connected together by means of internally threaded sleeve connections. The weights of the pipe sections are such that they are difficult to handle manually and, because of the threaded connections, the coupling sleeve of the pipe sections must be maintained in axial alignment to facilitate their threaded engagement. Furthermore the rigid threaded connections of pipe line elements are not entirely satisfactory when the pipe sections are laid directly on the irregular top surface of the ground. In such case any tendency which the pipe sections may have to conform with their undulating surface support or to otherwise move out of axial alignment with a threaded coupling imposes severe strains on said threaded connections and thereby gives rise to the development of leaks at the joints.

According to the present invention, the pipe line is composed of thin wall conduit sections which can be readily handled by a minimum amount of labor. Also the joint connections are such that the pipe line can be laid on the irregular top surface of the ground, since the conduit sections can be readily and securely connected to provide leak proof joints even though the conduit sections are out of axial alignment with the coupling elements. In this connection the invention includes a joint structure in which the interfitting elements of the joint have complementary convex and concave sealing surfaces as distinguished from threaded and/or interfitting conical surfaces.

The interfitting coupler elements of the improved joint structure, considered more specifically, comprise a coupler element having a tubular body provided with a central bore of the same diameter as the internal diameter of the conduit to be connected thereto. An end portion of said body is provided with convex surface which forms a segment of a sphere. The adjacent end of a conduit section is formed with an outwardly flared concavo-convex flange positioned so that the concave surface thereof is complementary to the convex surface of the coupler body and thereby insure uniform sealing engagement with the said convex surface of the coupler body even though the conduit and coupler are out of axial alignment. The said flange of the conduit and the coupler body are pressed into fluid sealing engagement by means of a spanner nut surrounding the flanged end of the conduit and having threaded engagement with the coupler body. The said nut is formed with a convex inner face and cooperates with a similarly formed concave surface of an adjacent element of the structure to press the entire convex area of the said outwardly flared flange of the conduit against the end of the body and at the same time permit substantial clearance between the nut and the outer surface of the conduit to permit the conduit to assume an angular position relative to the axial center of the nut.

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A further important feature of the invention is to provide the conduit element of the joint with a flange of special construction, whereby the junction of the flange with the inner surface of the conduit defines a sharp angle as distinguished from the conventional or fillet surface so that when the parts of the joint are in alignment, the junction of said flange at the inner edge of the conduit can be drawn tightly against the end of said coupler body and thereby close any gap or pocket which would otherwise exist between the conduit and its associated coupler body.

Another important object of the invention is to provide a fluid coupling of this type having threaded parts adapted to be tightened to effect the joint and in which means are provided whereby dirt or other forming matter which may have accumulated on the threads in the field or at the scene of installation will, upon tightening of the joint, automatically be "swept away" so to speak, from the threaded parts and deposited at locations where they are rendered harmless so that they will not interfere with proper tightening of the joint.

The provision of a conduit joint structure which is relatively simple in its construction and which therefore may be manufactured at a low cost; one which is capable of ease of assembly and disassembly; one which is rugged and durable and which therefore is unlikely to get out of order; and one which otherwise is well adapted to perform the services required of it, are further desirable features that have been borne in mind in the production and development of the present invention.

The invention is illustrated, in two preferred embodiments in the accompanying three sheets of drawing.

In these drawings:

Fig. 1 is a side elevational view, partly in section, showing one embodiment of the improved joint structure for connecting the adjacent ends of a pair of conduit sections;

Fig. 2 is an enlarged fragmentary sectional view of the portion of the structure enclosed within the broken line circle in Fig. 1;

Fig. 3 is a sectional view, partly in elevation, taken substantially centrally and longitudinally through a coupling connector body employed in connection with the present invention;

Fig. 4 is an end elevational view of the structure shown in Fig. 3;

Fig. 5 is a sectional view, partially in elevation of one of the spanner nuts shown in Fig. 1;

Fig. 6 is an end view, in elevation, of the element shown in Fig. 5;

Fig. 7 is a view similar to Fig. 1, but illustrating a modified embodiment; and

Fig. 8 is an enlargement of the structure enclosed within the broken line circle shown in Fig. 7.

Referring now to the drawings in detail and in particular to Fig. 1, the invention is exemplified in a joint structure designed for connecting together the adjacent ends of a pair of conduit sections 10 and 11, each of

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which is provided with a flared end 12. The flared end 12 presents convex inner and concave outer surfaces 13 and 14 respectively (see also Fig. 2) which are preferably band fragments of a spherical surface and the inner surface or bore 15 of each conduit section merges with the inner surface of the flared portion of the section to define a relatively sharp circular edge 16 (see Fig. 2) for purposes previously referred to and will be further discussed presently.

The joint structure includes a coupler assembly and the flared end 12 of a conduit section. The coupler assembly as illustrated in Fig. 1 comprises three main metallic coupling parts preferably, though not necessarily, formed of aluminum and including a central threaded body or core 21, and two cooperating coupling nuts 22 and 23.

The coupler body or core 21 is generally annular in configuration and is formed with a cylindrical bore 24 therethrough and a pair of end clamping surfaces 25 and 26 respectively which are generally of frusto-spherical configuration and which actually present curved surfaces whose radii or curvature are substantially equal to the radius of the surface 13. The surfaces 25 and 26 are each formed with a continuous circular groove 27 therein adapted to contain a resilient O-ring 28 which may be formed of rubber of a suitable rubber substitute and which is adapted to be compressed against the inner surface 13 of one of the flanges 12 when the surfaces 13 and 26 are brought into face-to-face contact during coupling operations.

The outer cylindrical surface of the coupler body or core 21 is provided with a series of interrupted threads 30 which may be of average pitch with the tooth interruptions being formed in longitudinal alignment at spaced locations circumferentially of the body member. While any desired number of such rows of tooth interruptions may be provided, three such rows have been illustrated herein and are deemed adequate for the purposes intended. The various tooth interruptions may conveniently be formed by machining a series of longitudinal grooves 31 across the outer face of the threaded body member 21.

The two coupling nuts 22 and 23 are identical in construction and therefore a description of one will suffice for the other. The coupling nut 23 is generally of cylindrical design and includes an inner cylindrical portion 32, an outer cylindrical portion 33 and an interconnecting wall 34, the latter providing an inner clamping surface 35. The coupling nut 23 is threaded interiorly as at 36, these latter threads being designed for mating engagement with the threads 30 on the coupling 21 when the parts are assembled. The threads 36, like the threads 30 on the coupling body, are interrupted as at 37 at spaced circumferential locations by machining a series of internal longitudinal grooves in the inside surface of the coupling nut, three such grooves being illustrated herein. A plurality of spanner recesses 38 are formed on the cylindrical portion 32 of the coupling nut and are designed for cooperation with the usual spanner wrench or other suitable tool during coupling assembly operations. The previously mentioned teeth interruptions shown at 31 and 37 on the body member 21 and coupling nut 23 respectively are provided for the purpose of maintaining the mating threads clear of dirt particles and other foreign material in a manner that will be made clear subsequently.

As shown in Figs. 1 and 2, the convexo-concave flanges 12,12 of the tubes 10, 11 are clamped between the convex surfaces 25, 26 of the body 21 and the concave surfaces 35, 35 of the spanner nuts 22, 23. The radii of the said surfaces 25, 26 and 35,35 correspond to the arcuate cross-section of the flanges 12,12 and consequently permits surface

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engagement with each other in sealing relation when the nuts 22, 23 are tightened on the threaded body 21. With the parts thus assembled, it will be seen that the resilient O-ring 28 will be compressed within the groove 37 to enhance the seal between the flanged ends 12, 12 of the conduit sections and the convex and surfaces of the body 21.

From the above description it will be seen that in order to install the coupling assembly on the adjacent flared ends of the pair of conduit sections 10 and 11 the flared flange portions 12 of the two conduit sections are brought to bear against the oppositely facing clamping surfaces 25 and 26 of the body 21 so that the conduit bores 15,15 of the conduits and the cylindrical bore of the body member 21 are brought into approximate alignment. The clamping nuts 22 and 23 are brought into position and caused to be threaded upon the coupling body 21 so as to draw the various clamping surfaces. In the even that either conduit 10 or 11 are misaligned, as shown in dotted lines in Fig. 1, because of undulation in the ground or supporting surfaces on which the conduit sections are laid, such misalignment does not prevent a flat surface fit of the transversely curved surfaces of the flanges with the opposed surfaces of the body 21 to insure tightly sealed engagements.

It is to be noted that the central bore 39, 40 of the nuts 22, 23 are of greater diameter than their associated conduit section 10 or 11 so as to provide a substantial clearance between the nuts and the conduit sections, whereby either conduit may extend at an angle to the axial center of the nuts and the coupler body as shown in dotted lines in Figs. 1 and 2.

It is also to be noted that the metal of the flared end of the tube is displaced toward the junction of the flange with the tube so as to form a relatively sharp edge 16 as distinguished from a conventional curved fillet. It is by virtue of these sharp edges 16,16 at the juncture between the conduit sections and their respective coupling members at opposite ends of the conduit sections that it is possible to close any gap or pocket that would otherwise exist at these juncture regions and thereby provide a continuous cylindrical bore through the conduit sections. While in connection with any individual joint structure a minor obstruction or a pocket existing at this juncture point and tending to create turbulence in the flow of fluid therethrough would ordinarily have no appreciable effect in retarding the flow of fluid, it should be understood that in the overall pipeline utilizing a large number of conduit sections, the resistance presented by said turbulence and obstructions are cumulative and thereby present a serious problem.

It is to be noted that the machined grooves 31 and 37 which extend across the face of the teeth 30 and 36 on the body 21 and nuts 22, 23 provide clearance spaces between the severed ends of the teeth which act as depositories for any dirt or other foreign material that may have accumulated on the coupling threads. As either nut 22 or 23 is turned upon the body member 21 throughout an angle of approximately 60°, there will be a sweeping action between the mating threads whereby any entrapped particles will be slid or rolled circumferentially along the teeth and eventually deposited within the various grooves provided for this purpose.

Referring now to the embodiment shown in Figs. 7 and 8 of the drawings: This embodiment, for the most part, is substantially the same as the structure shown in Figs. 1 and 2. Consequently the parts of Figs. 7 and 8 which correspond to like parts shown in the preceding Figs., are given the same reference characters. The principal distinctions between the two embodiments shown reside in the fact that, in the embodiment shown in Figs. 7 and 8, convexo-concave

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washers 41,41 are interposed between the flanges 12,12 of the conduit sections and the concave inner faces of the spanner nuts 22, 23. Accordingly, the concave inner faces designated 35a, 35a in Figs. 7 and 8 are formed with slighly larger radii than the similar faces 35, 35 shown in Figs. 1 and 2 so as to compensate for the thickness of the washers 35a, 35a. It will be observed also that the concave inner face 42 and the convex outer face 43 of the washer 41 correspond, respectively, to the curvatures of the concave outer surface 14 of the flanges 12, and the convex inner surface 35a of the modified spanner nuts 22a, 23a. The use of the washer 41 makes it practical to provide the structure (Figs. 7 and 8) with clearance 39a, 40a between the nuts and the outer surfaces of the conduits, which clearance is somewhat greater than shown at 39 and 40 in Figs. 1 and 2 and therefore permits a wider range of angular movements of the conduits 10 and 11 relative to the body 21. However, the position of the washers 41 are such as to apply pressure to the flanges 12,12 near their junction with the conduits.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

In a conduit joint structure, a conduit, a coupler body formed with external threads and arranged in end-to-end engagement with said conduit, and a nut engaging the external face of said conduit and provided with internal threads for receiving the external threads of said coupler body and adapted upon rotation of the nut relative to said body to clamp said conduit and body together; the said coupler body being formed with a series of longitudinal grooves corresponding in depth to the depth of the threads and extend co-extensively across the threaded portion of said body with the sides of each groove being parallel at the interruption of the threads and the said nut being formed with a series of longitudinal grooves traversing the internal threads thereof each having arcuate sides merging into the bottom at the base of the threads.

ROGER DUHAMEL, F.R.S.C., Queen's Printer and Controller of Stationery, Ottawa, 1961

FIG. 1

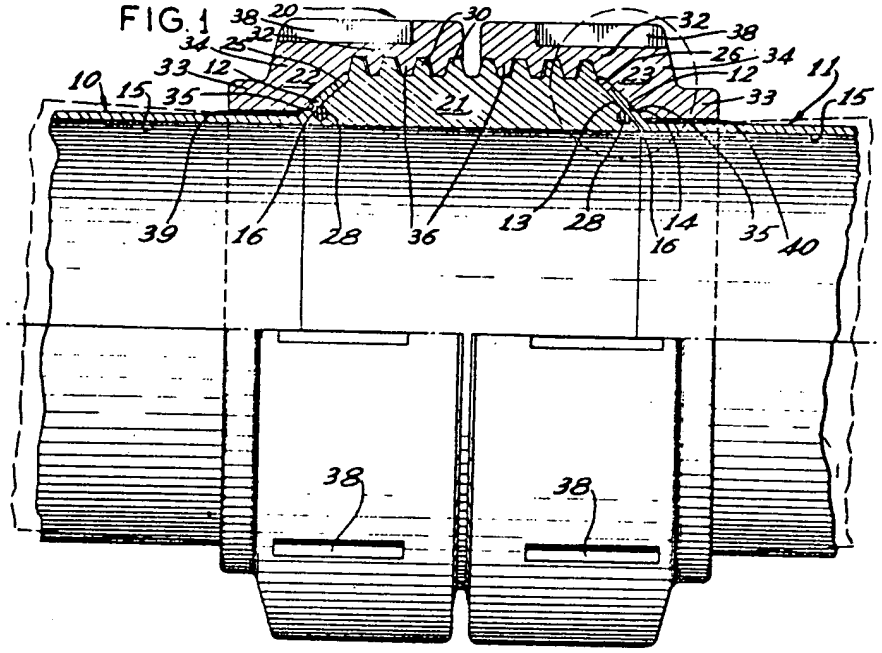

FIG. 3

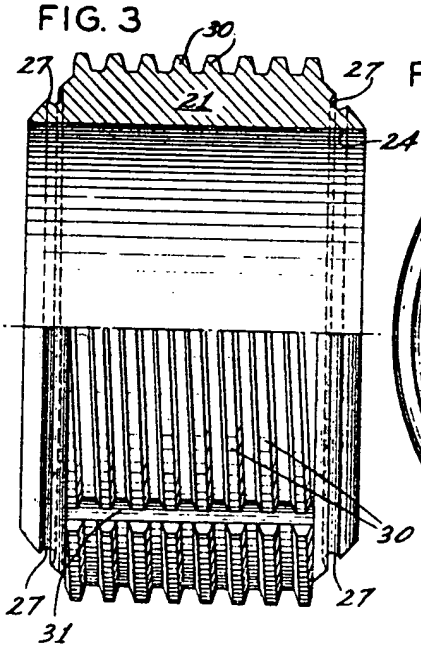

FIG. 4

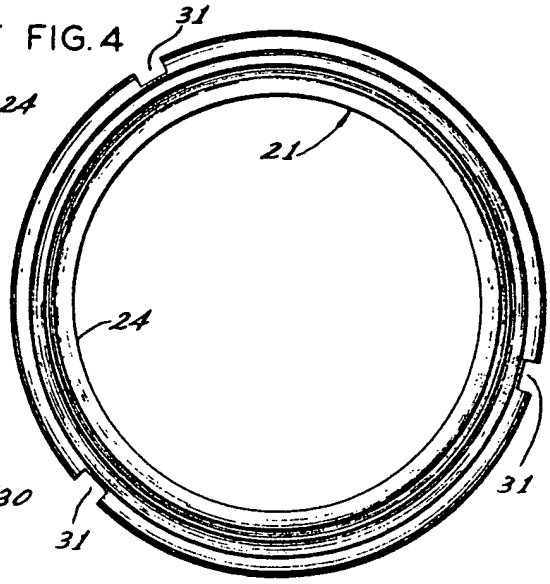

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FIG. 5

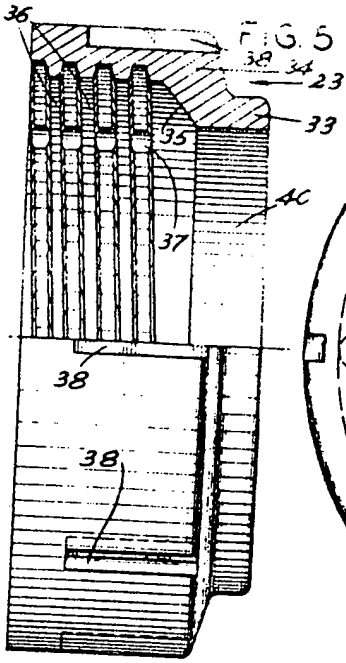


FIG. 6

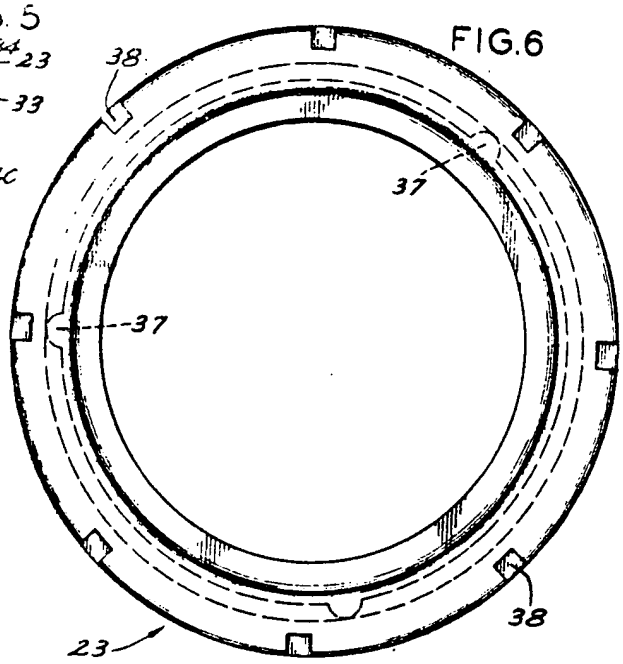
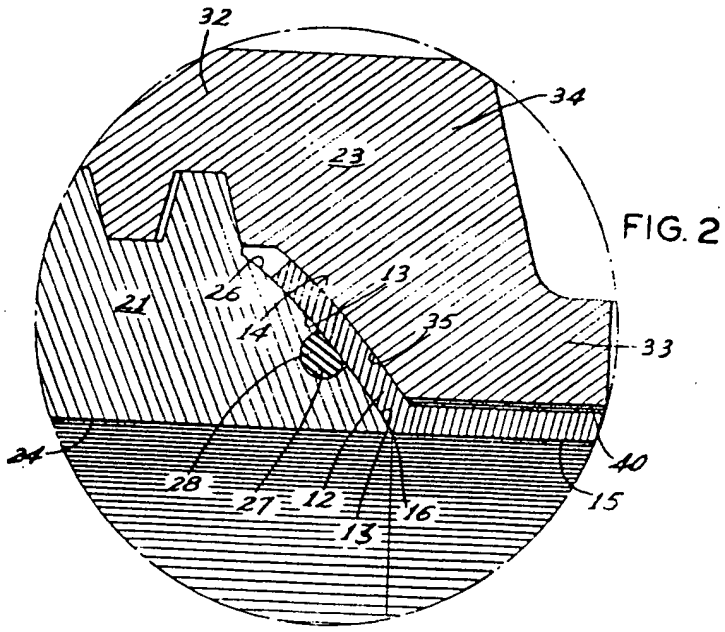


FIG. 2



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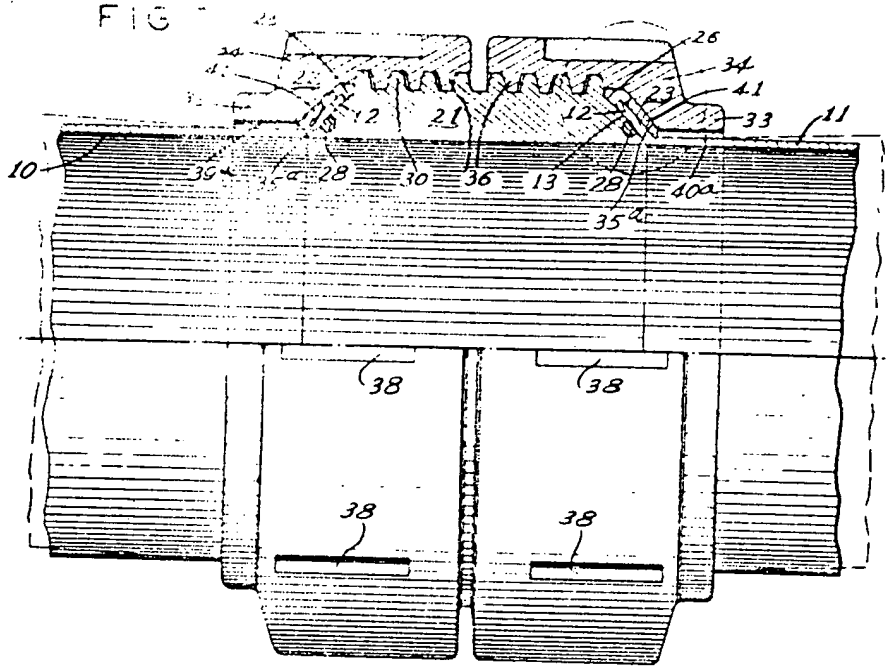
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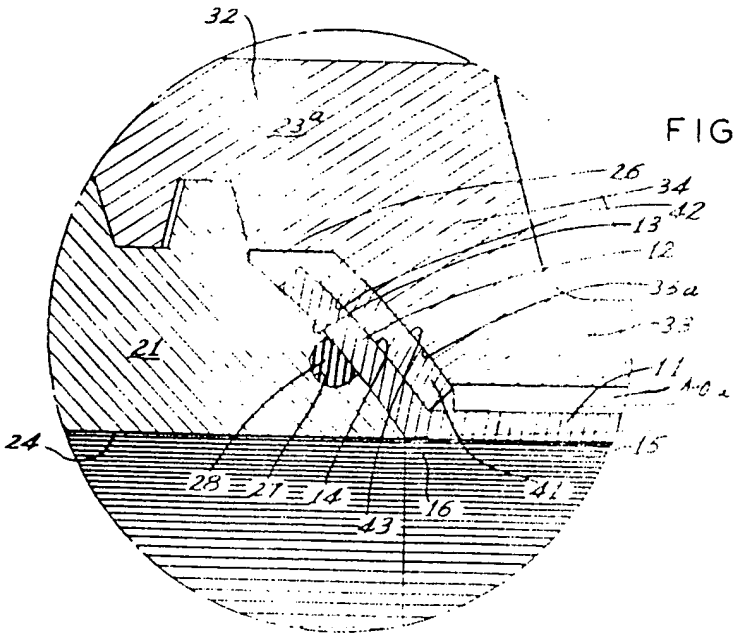
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FIG. 8